DT472

Recherche

PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : H04N 7/10, G08B 27/00

A1

(11) International Publication Number: WO 95/08243

(43) International Publication Date: 23 March 1995 (23.03.95)

(21) International Application Number: PCT/CA94/00506

(22) International Filing Date: 15 September 1994 (15.09.94)

(30) Priority Data:
2,106,223 15 September 1993 (15.09.93) CA

(71) Applicant *(for all designated States except US)*: METEOMEDIA/THE WEATHER NETWORK [CA/CA]; 1755 René-Levesque Boulevard East, Montreal, Québec H2K 4P6 (CA).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: MACKINNON, Russell, D., N. [CA/CA]; 38 St. Paul, Knowlton, Quebec J0E 1V0 (CA). BOULANGER, Jean-Pierre, M. [CA/CA]; 79 Normandie, Hull, Québec J8Z 1N6 (CA).

(74) Agent: BERESKIN & PARR; 40th floor, 40 King Street West, Toronto, Ontario M5H 3Y2 (CA).

(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD).

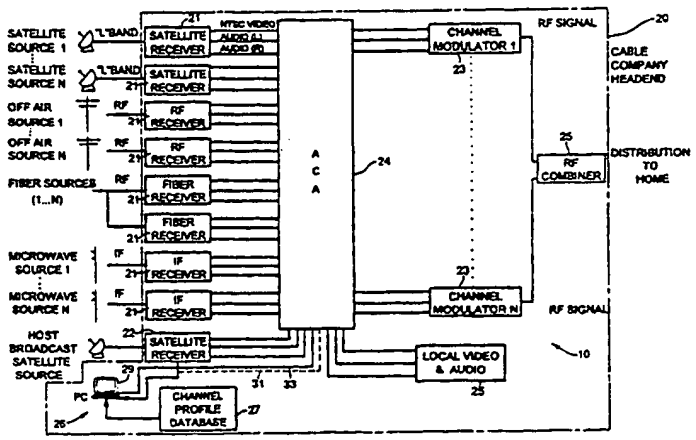
Published

With international search report.

Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

Reg.

(54) Title: A VIDEO AND AUDIO ALERTING SYSTEM FOR A CABLE TELEVISION NETWORK



(57) Abstract

A system for receiving alerting or public interest messages from a remote agency and displaying the alerting information on selected channels of a cable television network in order to provide a warning system for viewers of a cable television network having one or more cable channels. The system comprises communication interface means for receiving the alerting messages; a processor for decoding the alerting messages; and a controller for formatting and inserting the alerting message on any of the cable channels. The alerting message can be displayed on the cable video signal as a single line of static text or horizontally scrolling text, or as a page of static text or vertically scrolling text, and can be accompanied by an audio signal. The alerting message can also be superimposed on an override video signal which is substituted for the cable video signal. The system includes the capability of displaying an abbreviated alerting message on any of the cable channels. In a minimally disruptive way, the abbreviated alerting message directs the viewers to a detailed message channel for viewing the entire alerting message. The system can also include a channel scheduling manager which is coupled to the processor. The channel scheduling manager contains a record of the block-out periods for each channel. The processor utilizes the scheduling manager to block-out alerting messages at predetermined times, for example, during the airing of a commercial endorsement.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria
AU	Australia
BB	Barbados
BE	Belgium
BF	Burkina Faso
BG	Bulgaria
BJ	Benin
BR	Brazil
BY	Belarus
CA	Canada
CF	Central African Republic
CG	Congo
CH	Switzerland
CI	Côte d'Ivoire
CM	Cameroon
CN	China
CS	Czechoslovakia
CZ	Czech Republic
DE	Germany
DK	Denmark
ES	Spain
FI	Finland
FR	France
GA	Gabon
GB	United Kingdom
GE	Georgia
GN	Guinea
GR	Greece
HU	Hungary
IE	Ireland
IT	Italy
JP	Japan
KE	Kenya
KG	Kyrgystan
KP	Democratic People's Republic of Korea
KR	Republic of Korea
KZ	Kazakhstan
LI	Liechtenstein
LK	Sri Lanka
LU	Luxembourg
LV	Latvia
MC	Monaco
MD	Republic of Moldova
MG	Madagascar
ML	Mali
MN	Mongolia
MR	Mauritania
MW	Malawi
NE	Niger
NL	Netherlands
NO	Norway
NZ	New Zealand
PL	Poland
PT	Portugal
RO	Romania
RU	Russian Federation
SD	Sudan
SE	Sweden
SI	Slovenia
SK	Slovakia
SN	Senegal
TD	Chad
TG	Togo
TJ	Tajikistan
TT	Trinidad and Tobago
UA	Ukraine
US	United States of America
UZ	Uzbekistan
VN	Viet Nam

Title: **A Video and Audio Alerting System for a Cable Television Network**

FIELD OF THE INVENTION

This invention relates to an emergency broadcast system which is suitable for cable television network use. More particularly, the present invention relates to a system which allows the video and/or audio programming to be automatically interrupted for emergency announcements.

BACKGROUND OF THE INVENTION

There are known emergency warning systems for use by television broadcasters. These allow for manual intervention, by the broadcaster, of the existing programming in response to receiving an emergency or warning notification from a government authority or appropriate message originator.

Cable television has become the primary delivery system to the home in modern television infrastructures. The cable distributor usually supplies both distant and local television signals to the home. Emergencies, however, are usually of a local nature.

Transmission of video and audio signals to local cable television stations for immediate use, rebroadcast, or recordation for later broadcast is well-known. The broadcast of emergency warnings over television, for example weather storms, is also known. The existing television networks provide a convenient vehicle for reaching the public in times of emergency.

In known systems, the scheduled programming is typically manually interrupted by the local broadcaster using a combined audio and visual warning announcing the emergency information. The broadcaster receives notification of an emergency or warning from an emergency or national authority (e.g. tornado

watch from the National Weather Service). It will be appreciated this emergency warning procedure can be a slow process.

While this approach may be acceptable for some emergency warning systems, it falls short of providing an effective and flexible emergency announcement which accommodates both the needs of the public and the commercial realities of operating a television network. For example, certain emergency situations may entail more information than can be displayed across a single line, and therefore the emergency announcement system should have better capability of providing information for the viewer in a minimally disruptive way. In other emergency situations, for example, a weather storm warning or other low priority event, the emergency is not impending and therefore it is not necessary to immediately warn the public. If the emergency announcement system pre-empts a commercial spot, then the television station will lose revenue in a situation when immediate notification of the public is not necessary. Furthermore, the manual nature of the emergency notification can result in a slow speed of response. Some work has been done on a device that can be inserted between the cable company's signal receiving equipment and the cable channel modulators. Such devices are based on videotext and therefore it can be very expensive to install this equipment.

Given the importance, but disruptive nature, of an emergency warning system, there is a need for an emergency announcement system which can be integrated, in a cost effective manner, with a television network to provide priority warning announcements to the public on a timely basis, while at the same time minimizing disruptions to the commercial operations of the television network.

SUMMARY OF THE INVENTION

The present invention provides a system for weather

and emergency organizations to alert cable television viewers of impending dangers, e.g. weather warnings, chemical spills. The system can include the capability for placing text messages on selected channels; for an override video to be switched onto desired channels; and for an override audio to be switched onto desired channels. The system can include the capability to provide the emergency notifications with varying degrees of interruption to the scheduled programming.

In one aspect, the present provides a system for alerting viewers on a cable television network having a plurality of cable channels available to the viewers, said system comprising: (a) receiving means for receiving alerting information messages; (b) processing means for decoding said alerting information messages; (c) said processing means including insertion means for inserting an alerting information field on one or more of said cable channels and for inserting an alerting information page on another selected cable channel, said alerting information page containing more alerting information than does said alerting information field; and (d) said alerting information field including a direction to direct the viewers to said other selected cable channel for viewing said alerting information page, so that said alerting information page provides a detailed message on said selected cable channel with minimal disruption to said other cable channels.

In another aspect, the present invention provides a method for alerting viewers of a cable television network having one or more cable channels available to the viewers, the method comprising the steps of: (a) causing the display of an alerting message on one or more of said cable channels so that the viewers are alerted; (b) including a direction in said alerting message to direct the viewers to another selected cable channel for additional details; (c) displaying the additional details on said other selected cable channel.

In another aspect, the present invention provides a system for receiving alerting information messages from a remote agency and inserting alerting information on selected channels of a cable television network in order to provide a warning system for viewers of the cable television network having one or more cable channels, said system comprising: (a) communication interface means for receiving the alerting information messages from the remote agency; (b) processing means for decoding and responding to the alerting information messages; (c) channel scheduling means coupled to said processing means, said channel scheduling means having means for providing to said processing means an alerting message blocking signal for each of the cable channels in the cable television network; (d) said processing means including routing means responsive to said alerting message blocking signal for blocking routing of said alerting information message; and (e) said processing means further including means for producing an alerting information field and means for inserting said alerting information field on one or more signals of the cable channels for notifying the viewers of the cable television network.

In yet another aspect, the present invention provides a method for alerting the viewers of a cable television network having one or more cable channels available to the viewers, said method comprising the steps of: (a) receiving an alerting information message from a central agency; (b) processing said alerting information message to determine a cable channel destination for said alerting information message; (c) using a channel scheduling signal to determine if said cable channel destinations can be interrupted by said alerting information message; and (d) routing said alerting information message to said cable channel destinations which can be interrupted as determined in step (c).

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the present invention, and to show more clearly how it may be carried into effect, reference will now be made, by way of example, to the accompanying drawings in which:

Figure 1 shows in block diagram form a system according to the present invention in relation to a cable television network and an emergency broadcast agency;

Figure 2 shows in diagrammatic form a typical cable television network which is suited for use with the system of Figure 1;

Figure 3 is a detailed block diagram of an alert unit for the system shown in Figure 1;

Figure 4 is a flow chart which shows the emergency broadcast modes available for the system of Figure 1;

Figure 5 shows the format of the message packets used by the system of Figure 2; and

Figure 6 is a flow chart which shows a commercial blocking and day-parting feature for the system of Figure 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference is first made to Figure 1 which shows in block diagram form an overview of a video and audio alerting system according to the present invention. The purpose of the system 10 is to distribute emergency messages and warnings to various regions which are serviced by a television or other form of communication network.

In the following explanation, the alerting system 10 is integrated with a cable television network 11 as shown in Figure 2. The cable network provides the link between the alerting system 10 and the final home viewer. The alerting system 10 is located at a "cable head-end" 20 for each region which is to be serviced. As will

be explained in detail below, the alerting system 10 according to the present invention has the capability to place (in a number of different ways) emergency messages on any or all the channels carried by the cable television network 11.

As shown in Figure 2, the video and audio alerting system 10 is configured to receive emergency alerting information from one or more message originators 12 via a satellite communication link 14. The message originators 12 are typically a government emergency or other official warning agency. The emergency information is first received and processed by a control center 16. The control center 16 verifies and then processes the information and oversees the administration and control of the systems 10 located at the cable head-ends 12. As shown in Figure 2, the message originators 12 can be coupled to the control center 16 using a variety of communication conduits, for example, the Data Pac network, the AMOS link, or a conventional telephone line.

The emergency warning agency 12 can be any agency which provides emergency warnings, e.g. a government weather agency or the Department of Defence. The role of the agency 12 in the context of the present invention is to provide emergency messages for distribution to the regions of the state, province or country which are serviced by the alerting systems 10. The emergency warnings and messages from the agency 12 can be designated for a particular region or at a certain priority, and as will be explained below, the system 10 according to the present invention has the capability to provide various levels of messaging and distribution.

The control center 16 is the pre-processor of the emergency information and the master over the remote alerting systems 10. The control center 16 uses the satellite communication 14 to transmit control data and emergency information to the remote alerting systems 10. The control center 16 includes a central

computer 18 which is used to validate emergency information from government agency 12 and ensure that it meets the required standards and formats. The central computer 18 also controls addressing of the remote alerting systems 16. Once the emergency information from the agency 12 has been validated, the central computer 18 formats and transmits the information according to the protocol utilized by the alerting system 10.

The cable head-end 20 includes a known system for providing the cable television programming to the cable subscribers, which primarily involves retransmitting programs broadcast by the television networks. For the purposes of this discussion, the cable television programming system is represented by block 26. The alerting system 10 located at the "cable head-end" 20 comprises a controller/demodulator 22, one to three alert units 24 and a local override video and audio signals source 25. The cable television signals (video and audio) from a number of sources 21, e.g. satellite receiver, microwave receiver or fiber cable receiver as shown in Figure 1, are also coupled to and routed through the alert unit 24. The controller/demodulator 22 receives the emergency information and converts it to the required format in order to display the information as static or scrolling text on any or all of the channels with a minimum of visual degradation to the original cable signal. The system 10 also has the capability of substituting the override video and/audio signals 25 for the original cable signal as will be explained below. In the absence of any emergency messages or conditions, the alert unit 24 does not alter the video and audio signals received from the cable television sources 21.

The controller/demodulator 22 is also coupled to a programming/commercial scheduling manager 26. The scheduling manager 26 comprises a channel profile data base 27 and a controller which can be a computer 29. The channel profile database 27 includes a schedule of the programming and

commercial time-slots for the programming which is being broadcast by the cable television station or cable head-end 20. The manager 26 can use the channel profile data base 27 to support the following features: (1) day parting; (2) commercial spot schedules; (3) priority; (4) postal codes; (5) authorization check; and (6) traffic logging. The channel profile database 27 is preferably organized on a channel by channel basis. The channel profile database 27 can be administered through a data channel from the controller 22 or locally through the computer 29.

The day-parting and commercial spot schedules are used by the manager 26 to "lock-out"emergency warnings or announcements based on the requirements of the cable television station. The day-parting and commercial play schedules prescribe periods when a channel is not available to the warning system. As shown in Figure 1, this decision is made upstream of the unit 24 in order to block the input of the emergency video and audio into the unit 24 in order to prevent pre-emption by the emergency announcement. The blocking can be affected through the manager 26 interrupting the emergency video and audio feed to the unit through a switch for example. For example, the scheduling manager 26 can use the commercial schedule to block low priority emergency warnings or announcements during the airing of a commercial to avoid pre-empting of the commercial and the consequent loss of advertising revenue. Similarly, the scheduling manager 26 can use the "day-parting" schedule to block emergency warnings or announcements for a specified period, for example, during normal business hours when the cable station's newsroom is working.

The priority and associated response data allows individual broadcasters to define their level of participation within the warning system 10. The priority and associated response data can be entered through a local input terminal, for example, the

controller 29. For example, during periods when the news rooms are in operation, the broadcaster may wish to have priority for their own response. Similarly, a low priority emergency notification cannot pre-empt a commercial spot having a higher priority.

Furthermore, distant signal originators (e.g. signal receivers 21 in Figure 1) while not interested generally in providing a local response, may still wish to protect their commercial schedules. It will be appreciated by those skilled in the art that the channel profile database 27 can also be used distant broadcasters to provide a configurable participation level in the emergency alerting system 10 as specified by the schedules in the channel profile database 27.

The postal code data in channel profile database 27 can be used in conjunction with a postal code field imbedded in the command structure to validate traffic to alerting unit 24 on a channel by channel basis. See command structure below.

The authorization data in the channel profile database 27 is used to confirm the validity of the user in a local application, for example, configuring the database 27 using a local terminal 29. The authorization data is typically downloaded from the controller 16 via the satellite link 14.

The traffic log feature can also be implemented in the channel profile database 27 to provide a 30-day traffic log, for example. The traffic log can be used to generate an activity report which details the pre-emption of the cable station on a channel by channel basis.

Referring back to Figure 1, the controller 22 is designed in known manner to receive a base-band signal with a data subcarrier via a satellite dish 15 (and receiver). The controller 22 decodes the received data and determines if the data is applicable to the cable head-end 20 and outputs it on a data line 31 (shown as a broken line) which is coupled to an interface board 30 in the unit

24. As will also be described in detail below, the alert unit 24 then determines to which channel(s) the data will be applied. It will be appreciated by those skilled in the art that this arrangement provides considerable flexibility for displaying emergency messages and information. The alert unit 24 receives commands and data messages (or packets) from the controller 22. The alert unit 24 interprets the commands and data messages to display the emergency messages on the desired cable channels in the required format as will be discussed in more detail below.

If the programming/commercial scheduling manager 26 is being implemented with the system 10, then the data line 31 is coupled to the controller 29, and the computer 29 has an output data line 33 which is coupled to the input on the alerting unit 24. The controller 29 includes runs a computer program which "screens" the incoming emergency notifications according to the content of the channel profile database 27 as will be described below. For example, in the commercial pre-empting block feature, the manager 26 will block the command/data messages from reaching the alert unit 24 (on data line 33) until the commercial has played.

Reference is next made to Figure 3 which shows the alert unit 24 in detail. In the preferred embodiment, the alert unit 24 comprises nine channel boards 28, and the interface board 30. Each channel board 28 is designed to process four cable channels, giving the unit 24 a thirty-six channel capacity. In addition, up to three units 24 can be daisy-chained with controller 22 for a total capacity of 108 cable channels, which is sufficient capacity for a typical cable head-end. The following describes the circuitry for the first cable channel (indicated generally by reference 29) on channel board 28. The circuitry for remaining 35 channels (which can be configured in a unit 24) is virtually identical to the circuitry shown in Figure 3 for the first cable channel 29.

The alert unit 24 is housed in a rack-mount chassis or cabinet (not shown). The channel boards 28 and interface board 30 are coupled to a main backplane 32. The alert unit 24 also includes a power supply (not shown). The main backplane 32 has slots for each of the channel boards 28 and the interface board 30. The backplane 32 is mounted across the back of the chassis (not shown) and includes connectors (e.g. BNC type and terminal strips) for coupling the alert unit 24 to the controller 22 and the cable television signal sources 21.

Each channel card slot in the backplane 32 includes a hardwired slot number 34. The slot number 34 comprises four hardwired pins that define the number (i.e. 1 through 9) of the channel board 28 which is mounted in the slot on the backplane 32. The backplane 32 also includes a unit identifier 36 which identifies the alert unit 24. Since up to three units 24 can be daisy-chained, the unit identifier 36 comprises two lines which can be set by jumpers or a DIP switch (not shown) on the backplane 32. The channel card 28 identifies and decodes messages which have a tag corresponding to the unit identifier 36 and slot (or channel board) number 34. This arrangement allows the controller 22 to access channel boards 28 both on a board level (i.e. slot number 34) and on a chassis level (i.e. unit identifier 36).

Referring to Figure 3, the backplane has a video signal input 38 for each cable channel (comprising a BNC connector) and an audio signal input 40 for each cable channel. The video signal input 38 is coupled to the channel board 28 and in an emergency situation, the video signal for that channel will be processed by the channel board 28 according to the emergency notification data and command messages which are received from the controller 22 as will be discussed below.

If a channel board 28 has failed or is not plugged into the backplane 32, the alert unit 24 will provide fail-safe operation

and not interrupt the cable programming system 26. The backplane 32 includes a video signal by-pass relay 42 and an audio signal by-pass relay 44. The by-pass relays 40,42 have normally closed contacts which are controlled by the channel board 28. If the channel board 28 is defective or unplugged, then these contacts will be closed and the video signal input 38 and audio signal input 40 will be routed to the channel video signal output 39 and channel audio signal output 41. When a channel board 28 is unplugged, the associated by-pass relays (42 and 44) will connect the video signal input 38 and the audio signal input 40 to the respective outputs 39 and 41 to provide uninterrupted cable programming. When the channel board 28 is replaced, the associate by-pass relays (42 and 44) will remain closed until the controller 22 directs the channel board 28 to take other action. As shown in Figure 3, notwithstanding the by-pass relay 42, the video signal input 38 is always available to the channel board 28, via lead 45. This allows the channel board 28 to have uninterrupted video timing information which minimizes the time required for synchronization when processing and executing command messages.

Referring still to Figure 3, the backplane 32 also includes a replacement video signal feed 46, a replacement audio signal feed 48, an internal bidirectional control/data bus 52, a power and ground feed (not shown), a reset line 54, and a hardware failure line 56. The replacement video signal feed 46 is coupled to a override video signal input 60 and override video signal source 61 (shown as block 25 in Figure 1), which supplies each of the channel boards 28 with a video signal which can be substituted for the original cable video signal input 38. It will be appreciated by those skilled in the art that the video signal feed 46 must be properly terminated on the backplane 32, and unterminated tracks (not shown) must be laid out to avoid reflections. The replacement audio feed 50 is coupled to an override audio signal input 64 (and

override audio signal source 65 - shown as block 25 in Figure 1). The replacement audio feed 50 is connected to the respective by-pass relays 44. The audio by-pass relays 44 are controlled by the respective channel board 28. Although the channel audio input 40 (override audio signal input 64 and replacement audio signal feed 48) are shown as single lines, these signal lines are implemented as a differential signal pair. The bidirectional control/data bus 52 provides the communication link between the channel boards 28 and the interface board 30, as will be explained in more detail below. The interface board 30 drives the reset line 54, which provides a hardware reset to the channel boards 28. The interface board 30 also monitors the failure line 56 to detect any defective channel boards 28.

The alert unit 24 (chassis) also includes a power supply (not shown). A switching type power supply is preferred and the selected supply must be stable over a wide range of current consumption, as the number of installed channel boards 28 can vary from unit to unit.

Referring still to Figure 3, the primary functions of the interface board 30 are to buffer the replacement video and audio signals and drive the replacement video and audio signal feeds 46 and 48 on the backplane 32, and to provide an interface between the controller/demodulator 22 and the channel boards 28, via the data line 31 or 33.

The interface board 30 includes a high impedance video buffer 58 which couples a replacement video signal input 60 to the replacement video signal feed 46 on the backplane 32. The video signal feed 46 appears as a transmission line terminated by an impedance of 75 ohms at each end. Therefore, the video buffer 60 must be capable of driving a 37.5 ohm resistive load. The audio signal feed 48 is handled differently. Because it is undesirable to bring audio onto the channel boards 28 and no active components

are to be installed directly on the backplane 32, the board 30 includes a high power driver 62 which is coupled to a replacement audio signal input 64 and to each of the by-pass relays 44 (through a resistor network (not shown)).

As shown in Figure 3, the interface board 30 also includes an interface microcontroller (and firmware) 66. The interface microcontroller 66 can be implemented using the Intel MCS-52 family of microcontrollers which can include on-chip read-only program memory (ROM) or an external EPROM, random access memory (RAM), and other on-chip resources such as input/output ports, and timers/counters. The microcontroller 66 can include the capability to run software programs which are downloaded from the central computer 18. This can be implemented by including a "bootstrap" routine in the read-only memory and random access memory in the program space of the microcontroller, as will be understood by one skilled in the art. For example, when the interface microcontroller 66 is first powered-on it will execute the bootstrap routine until a update or downloaded program is received from the central computer 18. In this way, the software for each remote alert unit 24 can be upgraded or administered from a central location.

The primary function of the interface microcontroller 66 involves receiving command/data packets on data input line 33 (or 31) from the controller and demodulator 22 and translating these packets into the binary protocol used by the channels boards 28 on the control/data bus 52. The interface microcontroller 66 uses a serial communication link 68 (e.g. RS-232 type) to receive and transmit command/data packets from and to the controller/demodulator 22.

For downstream communication, the interface microcontroller 66 converts the packets received from the controller/demodulator 22 into the known HDLC/SDLC protocol

for communication on the internal bus 52. In the upstream direction, the interface microcontroller 66 converts the packets received from the channel boards 28 into the RS-232 format required by the controller/demodulator 22. The communication link 68 includes hardware flow control, i.e. a request to send line (RTS) and a clear to send line (CTS) to administer communication. Alternatively, the flow control can be implemented in the firmware of the microcontroller 66. The commands received by the interface controller 66 are listed in the attached Appendix.

The interface microcontroller 66 also monitors the hardware fault line 56, which indicates if a channel board 28 has failed. If a channel board 28 has failed the interface microcontroller 66 will send a fault message (see Appendix) to the controller/demodulator 22. In response to a failure, the interface controller 66 can also affect a reset (via the hardware reset line 54 on the backplane 32) to the channel boards 28. The reset can be used to restart the channel board microcontroller and firmware (see below), and to put the channel board 28 into a known state, which can be confirmed by a status inquiry command (see Appendix).

Reference is next made to the channel board 28 shown in Figure 3. Each channel board 28 supports four cable channels (video 38 and audio 40). The channel board 28 includes a microcontroller 70, four character generator circuits or chips 72 (one for each video channel 38), a video buffer 74 for the cable video input signal 40, a video buffer 76 for the replacement video input signal feed 46, and a video buffer 78 for the video output signal. The character chip 72 is used by the alert unit 24 to generate the text characters for emergency or warning messages which are to be displayed on the cable video channels. (This will be explained in more detail below.) The input of the character chip 72 is coupled to a video switch 80 which is used to select the video input signal, i.e. cable video 38 or replacement video 46, under the control of the

microcontroller 70.

The channel board 28 microcontroller 70 can also comprise a monolithic integrated microcomputer which has on-chip programmable read-only memory (PROM) or external EPROM, and random access memory (RAM), a communication port (which couples to the bi-directional bus 52). As for interface microcontroller 66, the channel board microcontroller 70 includes random access memory in the program space to allow downloading of software via the serial communication link 68 and internal bus 52. The microcontroller 70 includes a bootstrap routine in PROM and can also include the operating program which is executed until a software download is detected or received.

The microcontroller 70 includes a software (firmware) program which is stored in the read-only memory and random access memory (which is mapped to the program space of the microcontroller 70). The primary functions of the firmware is to receive and execute the control/data messages which are transmitted by the interface microcontroller 66 on the control/data bus 52. The firmware includes a command interpreter routine which receives and executes the command/data packets from the bus 52, which is within the understanding of one skilled in microprocessor programming. For the purposes of this discussion, the command/data packets transmitted to the microcontrollers 70 on the channel boards 28 will have the same format as those listed in the Appendix. The firmware also includes routines or drivers for communicating directly with the four character generator chips 72 on each channel board 28. The firmware uses the random access memory as a buffer for the text which is downloaded by the central computer 18 via the controller 22 and interface board 30.

The character generator chip 72 is the BU2801S On Screen Display Integrated Circuit which is manufactured by the Rohm Corporation. The published circuit design and specification

sheets for the BU2801S are incorporated herein by this reference. The microcontroller 70 uses a serial link to load character and control data into the on-chip RAM on the character generator chip 72. The channel board 28 can include an additional bypass switch 82 which allows the selected input video (i.e. cable 38 or replacement video feed 46) to bypass the character generator 72. This function can also be implemented in the character generator chip itself.

The microcontroller 70 also has an input port 84 which is coupled to a vertical synchronization pulse circuit 86. The input port 84 is configured as an interrupt. The vertical synchronization circuit 86 provides the microcontroller (and firmware) 70 with sync pulses for the four video channels. The sync pulses are required by the firmware to properly manage the display tasks. It is important that the microcontroller 70 insure synchronization with each video channel so that the emergency message can be displayed without too much disruption to the underlying video signal. The microcontroller 70 also has an input port 88 for reading the unit identifier 36 and the slot address 34. The firmware uses the address information to identify messages on the bus 52 which are to be decoded and executed.

Referring still to Figure 3, the microcontroller 70 has a reset input 90 which is coupled to the hardware reset line 54 on the backplane 32. Each channel board 32 includes a failure indicator 92, which can be a red light-emitting diode (LED). The indicator 92 can be coupled to microcontroller 70 to signify error conditions arising under the inspection of the microcontroller 70. The signal to the indicator 92 can be logically "ANDed" with the reset signal 54 to reset only the channel board 28 which is reporting a failure.

In operation, the microcontroller 70 receives command and data packets from the bi-directional bus 52. The microcontroller 70 (firmware) selects or deselects the packets (defined in the Appendix) according to the tag identifier which

corresponds to the unit and slot addresses 36,34 or which corresponds to a dynamic identifier i.e. stored in memory and referenced to the tag identifer. The microcontroller 70 (and firmware) has the capability to send acknowledgement messages and status messages in response to an inquiry packet, for example. However, the primary function of the microcontroller 70 (and firmware) is to store and display text messages via the character generators 72 on the channel cable video signals 38 for selected cable channels.

On a firmware level, the microcontroller 70 processes control/data commands received on the bus 52 and updates and manages the video signals (and audio signals) according to the command directions. For example, the central computer 18 can instruct a static text display on cable channel 1 and a scrolling horizontal text line on cable channel 3. Once the text has "scrolled" for the selected time or iterations, the channel returns to normal video. In response to a power-on reset, the microcontroller 70 executes the firmware program from EPROM.

The operation of the alert unit 24 can be explained as follows. Under normal conditions, the alert unit 24 is a passive device which is transparent to cable video and audio signals 38,40 (Figure 3), i.e. the channel video signal 38 and channel audio signal 40 are passed through the channel board 28 undisturbed, (or through the closed by-pass relays 42,44 if the channel board 28 is unplugged from the backplane 32). Under active conditions, e.g. emergency notification, the alert unit 24 implements certain operations in response to commands and data which are received from the control centre 16 via the satellite 14 and controller/demodulator 22.

In the present embodiment, the alert unit 24 supports the following modes of operation: (1) superimpose text as a crawl message on the cable video channel; (2) superimpose text as a static

text window on the cable video channel; (3) replace the cable video signal 38 with the override video signal 60; (4) superimpose text as a crawl message onto the override video signal 60; (5) superimpose text as a full text page onto the override video signal 60; and (6) replace both channels of the cable audio signal 40 with the override audio signal 64.

These modes of operation provide the alert unit 24 with the capability to display emergency messages with varying degrees of disruption to the cable television viewer. The least disruptive mode of operation is (1) which involves displaying a crawl text message, and the most disruptive is (5) which replaces the cable video with the override video and superimposes a full text page. The modes of operation are implemented by the firmware (resident in the program memory of each channel board microcontroller 70) in response to a sequence of control and data commands (Appendix) which are received from the controller /demodulator 22 via the interface controller 66.

Reference is next made to Figure 4 which shows in flow chart form the modes in which the alert unit 24 can operate. The alert unit 24 operates under the control of the central computer 18 in response to commands and data which are transmitted to the controller/demodulator 22 as shown at block 300. The controller/demodulator 22 demodulates and decodes the commands and data (received from the control centre 16 via the satellite 14) and transmits the command and data packets in a serial stream to the interface controller 66. In the present embodiment, the interface controller 66 translates the command and data packets from RS-232 format into the HDLC/SDLC binary protocol for transmission on the bi-directional bus 52.

The communications protocol (Appendix) implements a "tag" concept which allows: (1) command and data packets to be broadcast to all channels in the alert unit 24; (2)

commands and data packets to be directed to a group of one or more channels; and (3) a command or data packet to be sent to a channel based on its physical location (i.e. unit number 36 and board slot 34 and channel number 1 to 4). The tag is contained in a tag byte in each command and data packet. To broadcast a command or data packet, the tag byte has a value of zero, which is accepted and executed for all channels. To configure a selected group of channels, the protocol has a "Tag Setup" command (Appendix). The "Tag Setup" command assigns any group of channels with a logical or dynamic identifier. The channel can then be accessed according to its logical identifier, physical tag or by a broadcast. In the present embodiment, a channel will only respond to one dynamic tag value at a time. A tag assigned to a channel will overwrite the previous tag assigned to that channel. The format of a command or data packet utilized in the present invention is shown in Figure 5. The "tag" for the packet is contained in the second byte.

The interface controller 66 puts the message packet on the bus 52 and the packet is accepted by one (or more) channel microcontroller 70 based on the value in the tag byte of the packet (Figure 5). Following this procedure, the central computer 16 uses the control command via the controller/demodulator 22 (Appendix) to control the type and content of the emergency announcement. If it is desired to substitute override audio (block 302), then the central computer 16 will transmit a control message which specifies that the bypass relays 42,44 (Figure 3) be switched to substitute the override audio and/or video. In response, the channel microcontroller 70 will activate the bypass relays 42,44 (Figure 3) through output line 43 (Figure 3), as indicated at block 304. If the emergency announcement does not include an audible notification, then block 304 is skipped, a command to substitute override audio is not issued to the unit 24.

An emergency announcement which includes a text message (shown at block 306) can be presented to the viewer in a number of ways. If the text message is to be superimposed on the override video signal (at block 308), the central computer 16 will transmit a control message which directs the selected channel microcontroller 70 to substitute the override video signal 60 (Figure 3) by switching the video by-pass relay 44, indicated at block 310. Once the override video decision has been made, the text display format is determined at block 312. The text message can be displayed in one of four ways: (1) a static line; (2) a static page; (3) a line of text crawling horizontally at a fixed rate; or (4) a text page which scrolls vertically at a fixed rate. In the present embodiment, the microcontroller 70 can store and display up to 240 lines of text. In conjunction with the character generator 72, the microcontroller can display the text as a line, a partial or full page of characters displayed statically at any one of 10 line positions, or as up to 240 lines of contiguous text scrolling vertically. The text can be downloaded by the central computer 18. In the present embodiment, both the crawl and scroll rates have been fixed, and approximately 12 seconds is required to traverse the screen.

If the text is to be displayed in the page format, the central computer 18 transmits a control packet with the fourth byte set to display the text as either a static page or a scrolling page (see format for control packet in Appendix), at block 314. The number of times a text page is to be scrolled can also be specified in the control packet (bytes 5 and 6). Once the central computer 18 has specified the text page format (and iterations), the channel microcontroller 70 will execute the text page display as indicated by blocks 316 and 318 in Figure 3. At the completion of the text page display, the selected channel can revert to normal programming until the alert unit 24 receives additional instructions from the central computer 16 (block 320).

If the central computer 18 instructs a text line display, then the microcontroller 70 issues the appropriate instructions to the character generator to provide a line display (block 322). If the central computer 18 has requested a scrolling text line, then the microcontroller 70 will also the appropriate control commands according to the control packet contents, e.g. the number of scroll loops.

The present invention includes a number of features to provide maximum emergency notification without minimum interruption to the scheduled programming and/or commercial operation of a cable television station.

The first of these features allows the viewer, who is watching any channel (or a selected channel), to be alerted by a brief emergency announcement which directs the viewer to turn to a selected channel for full details of the emergency warning or announcement. For example, if there is a severe thunderstorm tracking into the viewing area of the cable station 20, the central computer 18 will download a single line text message which is to be displayed on all or selected cable channels (i.e. as specified in the tag byte of the command packet), other than one channel, which will be used to display a more detailed message ("the detailed message channel"). The detailed message channel can be, for example, a weather channel. The microcontroller 70 will display the single line message across the bottom of the television screen on all the channels and the message will direct the viewer to turn to the detail message channel for more detail. If the message is short it can be displayed as a single static line of text, on channels other than the detailed message channel. If the message is several lines, but still relatively short, it can be displayed either as several lines or as one line using the horizontal crawl feature, on channels other than the detailed message channel. For the detailed message channel, the microcontroller 70 will display the full text of the emergency

warning which was downloaded by the central computer 18. The degree of interruption can vary with the priority or seriousness of the emergency.

Reference is made to Figure 4 which depicts how this feature can be implemented by the system 10 as depicted by blocks 328 and 330. The central computer 18 instructs the channel microcontroller 70 to display a one line text message (static or crawling) on all or a selected group of channels. The one line text message, which is superimposed on the normal channel video signal 38 but otherwise preferably does not affect the normal channel video signal 38 or audio signal 40 on the cable channels in question, prompts the viewer to turn to detailed message channel for the emergency announcement and/or directions. On the detailed message channel, the central computer 18 instructs the channel microcontroller 70 to display a detailed message using the text page format. In addition, the central computer 18 can instruct the microcontroller 70 to display the override video signal 60 on the detailed message channel in place of the normal video signal 38. The override video signal 60 can simply be a blue or other background colour for the text message, which is supplied by a local override video source 61 (Figure 3). The central computer 18 can also instruct the channel microcontroller 70 to replace the channel audio signal 40 with the override audio signal 64 on the detailed message channel (or any other channel). The override audio signal 64 is supplied by a local override audio source 65 (Figure 3) and can include a simple beep or alerting tone or a series of pre-recorded voice messages.

It will also be appreciated that the alert unit 24 provides the flexibility to have the viewer alerted by substituting (on channels other than the detailed message channel) the override audio signal 64 for a specified period, e.g. before or during the display of the one line message.

By utilizing the scheduling manager 26, the display of emergency announcements by the alerting system 10 can be controlled on the basis of the channel profile database 27, for example, the programming schedule and requirements of the cable television station 20 which have been loaded or stored in the database 27. As discussed above, the controller/demodulator 22 is coupled to the scheduling manager 26. In its simplest form, the scheduling manager 26 comprises the database 27 and the controller 29. The database 27 has a record for each of the cable channels being televised by the station 20. Each record contains information pertaining to the programming or status of the corresponding cable channel. For example, if it is desired to block an emergency announcement during the playing of a commercial endorsement, the record can include a "commercial-in-progress" flag. When a command packet for an emergency announcement is received, the controller 29 checks or polls the "commercial-in-progress" flag. If the flag is set, i.e. a commercial is being televised, the controller 29 will wait until the flag is reset before sending the message to alert unit 24. The commercial-in-progress flag will be reset once the commercial has ended. A priority interrupt level can also be specified using the dynamic tag byte in the command packet (Figure 5). For example, if the priority level is high, the controller 22 will not block the emergency announcement even though the commercial-in-progress flag is set.

The scheduling manager 26 can also be used to implement the "day-parting" feature as introduced above. The day-parting feature provides the ability to block the operation of the alert system 10 for a selected period of time on all or selected cable channels. This feature can be used, for example, to block the display of emergency announcements during regular business hours (or during a newscast) when the newsroom of the station 20 is operational and capable of televising the emergency

announcement. As for the commercial pre-empting feature, the day-parting feature can be implemented by specifying a day-parting record in the channel profile database 27 which is checked by the controller 29 when a command/data packet is received from the central computer 18. The day-parting feature can also be combined with a priority hierarchy as discussed above.

As discussed above, the "commercial-in-progress" flag and "day-parting" feature is derived from programming schedule for each cable channel and in operation the channel profile database 27 which represents the programming schedule for each of the channels carried by the cable television station 20. As will be understood by one skilled in the art, the programming schedule comprises the times for broadcasting the feature programs and the time slots for playing the commercial endorsements. Typically, the programming schedule for a cable television station 20 is made up of feature programs which have been purchased from the major television networks and which will include some of the commercial endorsements that have already been sold by the television network. The programming schedule can also include time slots for commercial endorsements which have been sold by the cable station 20. Since the programming schedule is known ahead of time, the channel profile database 27 can be updated ahead of time, e.g. loaded on a weekly or even monthly basis. It will be appreciated that this simplifies the administration of the database 27 without compromising the performance of the commercial blocking and day-parting features of the present invention.

Referring back to Figure 4, the commercial block and day-parting features can be implemented by including a channel profile database 27 check after the command/data packet is received from the central computer 18 and translated or formatted by the controller 22 prior to the alert unit 24, so that the command can be blocked if necessary. This processing loop is indicated by arrows 301

and 303 in Figure 4. The check can implemented in a software program running on the controller 29 as a routine which queries the channel profile database 27 whenever a command/data packet is received from the central computer 18 for a channel, indicated generally by block 500 in Figure 4. The other features associated with the channel profile database 27, e.g. priority, postal code check and traffic logging, can also be implemented in analogous fashion.

Reference is made to Figure 6 which shows in flow chart form typical logical processing steps for the programming manager routine 500 for implementing the commercial block and day-parting features discussed above. Once the controller 22 has decoded a command/data packet received from the central computer 18, the routine looks up the record for the cable channel in the scheduling manager 27 at block 502. In block 504, the routine 500 checks the record for the commercial-in-progress flag. If the flag is set, then the routine 500 moves to block 506 which determines if the commercial can be interrupted by a high priority message. If the commercial cannot be pre-empted (at block 506), then the routine waits till the commercial has ended. If a commercial is not in progress (commercial blocking is not active), then the routine moves to block 508. In block 508, the routine checks the cable channel record in the scheduling manager 27 to determine if day-parting has been activated. If day-parting is active, i.e. programming cannot be interrupted, then the routine will wait for another command/data packet from the central computer 18. On the other hand, if day-parting is not active, i.e. emergency notification permitted, then the routine will proceed to block 512 which returns processing of the command/data packet to the alerting unit 2 (see Figure 4), as indicated by line 303.

Although the messages to be displayed have been referred to as being emergency warning messages, they can of course be any messages considered to be of over-riding public

interest, for example, news flashes or messages concerning important sporting events such as the World Series.

The present invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. For example, the controller/demodulator and interface controller can be combined. The presently disclosed embodiments are therefore to be considered as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

APPENDIX

Command Message Specifications

Command Type: Tag Setup Message

Source

External controller 22

Destination

Channel microcontrollers 70

Description

This message specifies the Channel Dynamic Tag for 108 channels, which is the maximum number for an alert unit 24. The first byte applies to the first channel on the first board of the addressed alert unit 24, while byte 36 applies to the fourth channel of the ninth board.

The tag assigned to any channel overwrites the previous Tag set for that channel. That is, a channel responds only one Dynamic Tag value at a time.

Notwithstanding the above, a channel will always respond to a message containing a Tag equal to zero, which is used to broadcast messages to all channels in the system. A channel will also respond to the proper physical Tag.

Data format

byte #	description
0	One byte identifying the target alert unit box: 1 = first box in the daisy chain 2 = second box 3 = third box
1 ...	from 4 to 36 by bytes corresponding to the quantity of channel boards 28 installed in the chassis.

Command Type: Display Attributes

Source

External controller 22

Destination

Channel microcontrollers 70

Description

This message sends an image of the 16 bit data to be loaded into registers at addresses 240 through 243 of the Rohm character generator chip 72.

In the preferred embodiment, each channel board 28 has five sets of display characteristics; the first is the default setup, contained in the alert unit 24 software. It cannot be modified by the setup message. The four remaining sets must be loaded by individual messages.

Except for the horizontal and vertical positioning information, the channel board software will not modify the Rohm chip's setup prior to or during a display operation. It is the responsibility of the command centre to use characteristics corresponding to what has been implemented in the firmware.

Data format

byte #	description
0 ... 31	Thirty two bytes corresponding to four sets of 8 bytes each.

Command Type: Data messages

Source

External controller 22

Destination

Channel microcontrollers 70

Description

The alert unit 24 is capable of displaying static or scrolling lines and pages of text. To simplify the data management on the channel board 28, all of the data will be manipulated using the concept of lines of text.

A total of 240 lines of 24 characters are stored and available per channel board 28. Each character requires two bytes of data, as described in the data sheet for the Rohm character generator 72, giving a total channel board requirement of just under 12 Kbytes.

The lines to be used in contiguous operations (e.g. scrolling and crawling) are always completely filled by the central computer 18, except for the last line, where an end-of-line/end-of-page will be indicated by the 16 bit value xx80. This corresponds to unused bit D7 in the (Rohm) character generator 72; it will always be zero except for the EOL/EOF condition. This mark will be used by scrolling/crawling operations.

Data format

byte #	description
0	One byte identifying the line number (1 - 240)
1 ... 48	24 characters, using two bytes each.

Command Type: Control messages

Source

External controller 22

Destination

Channel microcontrollers 70

Description

Each alert unit 24 channel is uniquely controlled by this type of message. A single message contains a complete definition of the data to act upon, the start and stop conditions, bypass switch 42,44 (Figure 2) conditions, and the transition from the active operation to the next one.

There is no queuing of operations for a cable channel. One operation may be in progress, and another one may be waiting. If a control packet arrives while a prior one is waiting, then the waiting packet is replaced with the new one. The operation in progress is not interrupted unless the new message so specifies.

Data format

byte #	description
0	The first line of text upon which to act: 0 don't care 1 ... 240 Line 1 to 240
1	The line number on the display screen at which to show the first line of text: 1 ... 10 Line number, where 1 is the first line at the top of the screen
2	The display characteristics set to be used in this operation: 0 don't care 1 ... 5 Setup data ID
3	The operation to be performed: 0 don't care 1 Display as static line 2 Display contiguous lines horizontally scrolling 3 Display as static page 4 Display contiguous lines as pages vertically

scrolling.

4 When to start the operation:

0 don't care

1 Now (at next VSync)

2 On logic relay input

3 After current operation is completed

5 When to stop the operation:

0 don't care

1 Now (at next VSync)

2 On logic relay input

3 Never (i.e., continue until cancelled)

4 After X loops

5 After X ticks (VSyncs)

6 Stop condition parameter (value of X)

0 don't care

X value for X

7 Bypass relay 42,44 (Figure 2) conditions to assume at Start of operation (see below)

8 Bypass relay 42,44 (Figure 2) conditions to assume at Stop of operation (see below)

In the bypass relay conditions field, bit #7 is used to indicate don't care (i.e. = 0) or active (i.e. = 1). One of the other bits will correspond to bit #C in the Rohm character generator 72 (Figure 2) definition to be used with this operation. The other bit can be defined during the alert unit 24 implementation. The net result is to provide relay and character generator combinations which allow channel video and audio to be bypassed with the relay, superimpose text over channel video, superimpose text over replacement video, or use replacement video and/or audio.

Command Type: Software load

<u>Source</u>

External controller 22

Destination

Channel microcontrollers 70

Description

This message is used to load a second version of operating software into the channel microcontrollers 70. Each message contains a physical address, followed by a series of bytes to be loaded starting at the address.

It is the responsibility of the controller 22 device to correctly place the software in the microcontroller 70 program address space.

Write protection for memory areas which should not be overwritten by operating software may be implemented as required.

Data format

byte #	description
0 ... 1	16 bit address (high byte first) at which to start loading the following series of bytes.
2 ... 50	Up to 48 bytes of data.

Command Type: Software Activation

Source

External controller 22

Destination

Channel microcontrollers 70

Description

This message is used to switch software execution to the previously loaded software. It contains only a physical address at which to start execution.

This message may also be used to cause a soft reset by jumping to the firmware entry point.

Data format

byte #	description
0 ... 1	16 bit physical address (high byte first) at which to start execution.

Command Type: Health Query

Source

if request: External controller 22

if response: Channel Microcontrollers 70

Destination

if request: Channel Microcontrollers 70

if response: External controller 22

Description

This message is used with a Physical Tag, and requests a reply with the current status of the corresponding channel board; 28 (Figure 2) i.e., the same reply is expected for the four channels on the same board 28 (Figure 2).

The reply contains the status of the microcontroller 70 plus any other board/channel status which may be defined during the design stage.

It is the responsibility of the controller 22 to regulate status requests, in order to avoid collisions due to multiple

channels responding at the same time, or too close to each other.

Data format

byte # description

request

no data

response

0 Microcontroller status

1 ... 4 Video channels (1 to 4) status

Command Type: Reset

Source

External controller 22

Destination

Interface Microcontroller 66

Description

On reception of this message, the interface microcontroller 66 will generate a pulse of appropriate duration on the backplane Reset line 54 (Figure 2).

This message is not forwarded to the channel boards.

Data format

byte # description

no data

Command Type: Fault

Source

Interface Microcontroller 66

Destination

External controller 22

Description

On detection of a fault (via the backplane fault line), the interface microcontroller sends this predefined message to the external controller.

This is the only unsolicited message issued by the alert unit 24.

Data format

byte # description

no data (may be defined during the design implementation).

Message format

The general format of all incoming messages is shown in Figure 5. A tag value of 0x00 implies that the message is for all channels in the system.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A system for alerting viewers on a cable television network having a plurality of cable channels available to the viewers, said system comprising:

(a) receiving means for receiving alerting information messages;

(b) processing means for decoding said alerting information messages;

(c) said processing means including insertion means for inserting an alerting information field on one or more of said cable channels and for inserting an alerting information page on another selected cable channel, said alerting information page containing more alerting information than does said alerting information field; and

(d) said alerting information field including a direction to direct the viewers to said other selected cable channel for viewing said alerting information page, so that said alerting information page provides a detailed message on said selected cable channel with minimal disruption to said other cable channels.

2. The system claimed in claim 1, further including channel scheduling means coupled to said processing means, said channel scheduling means including means for providing an alerting message blocking signal to said processing means, and said processing means including routing means responsive to said alerting message blocking signal for blocking said insertion of said

alerting information field.

3. The system claimed in claim 1, wherein said insertion means comprises controller means for producing a text message from said alerting information message and a character generator coupled to said controller means and having an input for accepting a video signal for one of said cable channels and means for combining said text message with said video signal for display on said one of the cable channels.

4. The system claimed in claim 3, wherein said insertion means includes an input for an override video signal and means for substituting said override video signal for said video signal on said one cable channel.

5. The system claimed in claim 4, wherein said processing means comprises a computer coupled to said communication interface means and to said controller means, said computer having means for processing said alerting information messages received from said communication interface means and transmitting said alerting information messages to said controller means.

6. The system claimed in claim 2, wherein said alerting message signal comprises a commercial-in-progress flag indicating that a commercial endorsement is scheduled for said cable channel.

7. The system claimed in claim 2, wherein said alerting message blocking signal comprises a day-parting record indicative of a selected period of time when alerting information messages are blocked.

8. The system claimed in claim 1 or 2 including support means for supporting said processing means, said support means including video input means for an input signal for one of said cable channels and video output means for an output signal for said one cable channel, said support means including switching means coupled between said video input means and said video output means and said processing means for routing said input video signal at said video input means to said video output means but for said switching means being responsive to failure of said processing means for routing said video signal at said video input means directly to said video output means.

9. The system claimed in claim 1 or 2 including support means for supporting said processing means, said support means including audio input means for an input audio signal for one of said cable channels and audio output means for an output audio signal for said one cable channel, said support means including switching means coupled between said audio input means and said audio output means and said processing means for routing said input audio signal at said audio input means to said audio output means but for said switching means being responsive to failure of said processing means for routing said audio signal at said audio input means directly to said audio output means.

10. The system claimed in claim 1, wherein said receiving means comprises a satellite communication interface having means for receiving and transmitting said alerting information messages from a satellite.

11. A method for alerting viewers of a cable television network having one or more cable channels available to the viewers, the method comprising the steps of:

(a) causing the display of an alerting message on one or more of said cable channels so that the viewers are alerted;

(b) including a direction in said alerting message to direct the viewers to another selected cable channel for additional details;

(c) displaying the additional details on said other selected cable channel.

12. A system for receiving alerting information messages from a remote agency and inserting alerting information on selected channels of a cable television network in order to provide a warning system for viewers of the cable television network having one or more cable channels, said system comprising:

(a) communication interface means for receiving the alerting information messages from the remote agency;

(b) processing means for decoding and responding to the alerting information messages;

(c) channel scheduling means coupled to said processing means, said channel scheduling means having means for providing to said processing means an alerting message blocking signal for the cable channels in the cable television network;

(d) said processing means including routing means responsive to said alerting message blocking signal for blocking routing of said alerting information message; and

(e) said processing means further including means for producing an alerting information field in response to the alerting information message

and means for inserting said alerting information field on one or more signals of the cable channels for notifying the viewers of the cable television network.

13. The system claimed in claim 12, wherein said routing means includes means for blocking an alerting information message to a selected cable channel in response to said alerting message blocking signal.

14. The system claimed in claim 13, wherein said alerting message blocking signal comprises a commercial-in-progress flag indicating that a commercial endorsement is scheduled for said cable channel.

15. The system claimed in claim 13, wherein said alerting message blocking signal comprises a day-parting record.

16. A method for alerting the viewers of a cable television network having one or more cable channels available to the viewers, said method comprising the steps of:

(a) receiving an alerting information message from a central agency;

(b) processing said alerting information message to determine a cable channel destination for said alerting information message;

(c) using a channel scheduling signal to determine if said cable channel destinations can be interrupted by said alerting information message; and

(d) routing said alerting information message to said cable channel destinations which can be

interrupted as determined in step (c).

17. A system for alerting viewers on a cable television network having a plurality of cable channels in response to receiving alerting messages from a central agency, said system comprising:

(a) receiving means for receiving the alerting messages;

(b) processing means for decoding said alerting messages and said processing means including means for producing a short text signal in response to said alerting message;

(c) said processing means including means for inserting said short text signal on all or a group of selected cable channels except for a selected detailed message cable channel; and

(d) said processing means further including means for inserting a full text signal on said detailed message cable channel.

18. The system claimed in claim 17, further including input means for accepting an override video signal and means for switching said override video signal onto said detailed message cable channel and means for superimposing said full text signal onto said override video signal.

19. The system claimed in claim 18, further including input means for accepting an override audio signal and means for switching said override audio signal onto said detailed message cable channel.

21. The system claimed in claim 1 or 2, further including

an input for accepting an override audio signal and switching means for switching said override audio signal onto all or a group of the cable channels.

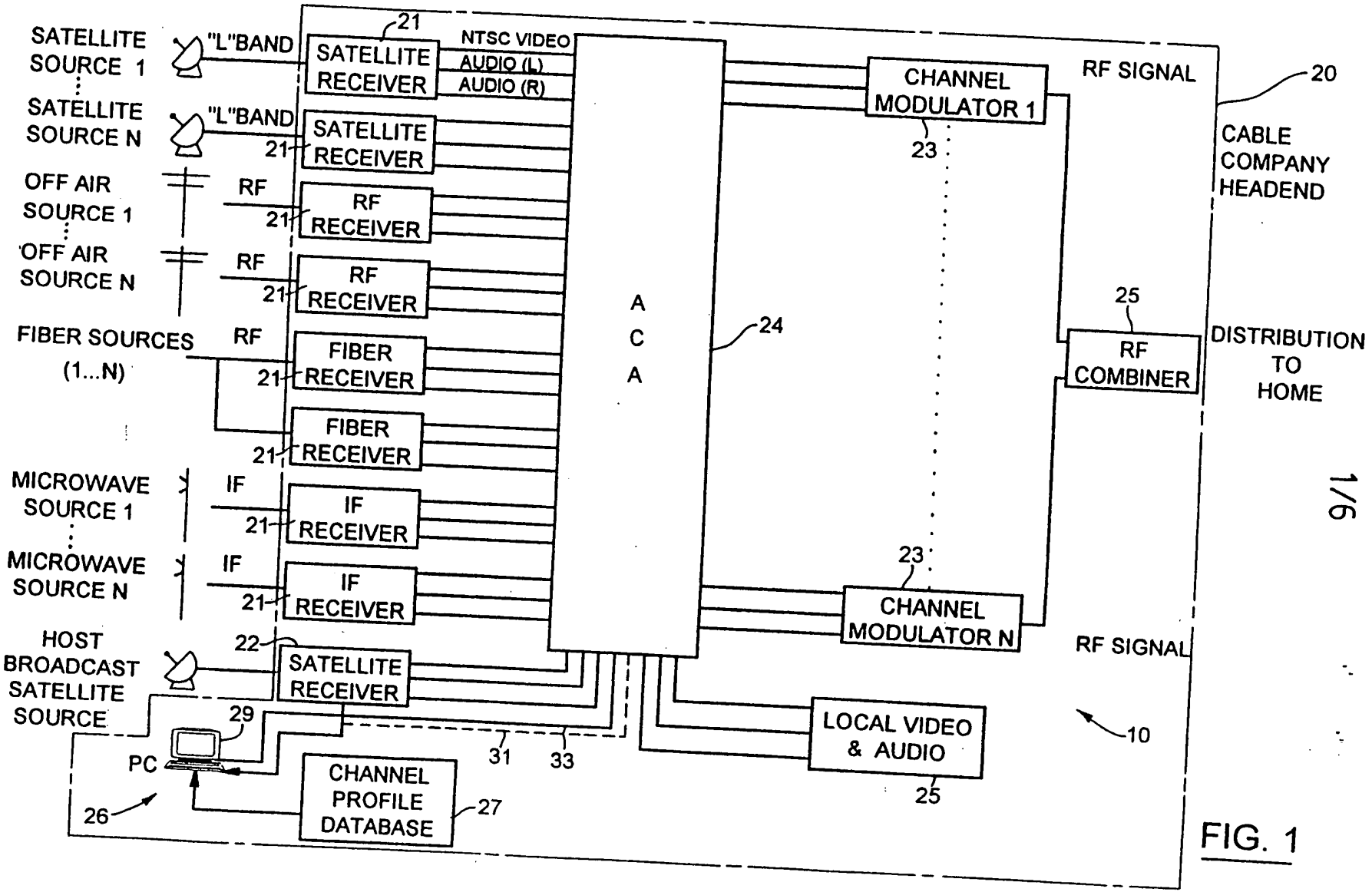

SATELLITE SOURCE 1
"L"BAND
SATELLITE SOURCE N
"L"BAND
OFF AIR SOURCE 1
OFF AIR SOURCE N
FIBER SOURCES (1...N)
MICROWAVE SOURCE 1
MICROWAVE SOURCE N
HOST BROADCAST SATELLITE SOURCE
21
SATELLITE RECEIVER
RF RECEIVER
FIBER RECEIVER
IF RECEIVER
22
SATELLITE RECEIVER
NTSC VIDEO
AUDIO (L)
AUDIO (R)
RF
IF
A
C
A
24
CHANNEL MODULATOR 1
23
CHANNEL MODULATOR N
RF SIGNAL
20
CABLE COMPANY HEADEND
25
RF COMBINER
DISTRIBUTION TO HOME
LOCAL VIDEO & AUDIO
25
RF SIGNAL
10
PC
29
26
CHANNEL PROFILE DATABASE
27
31
33

FIG. 1

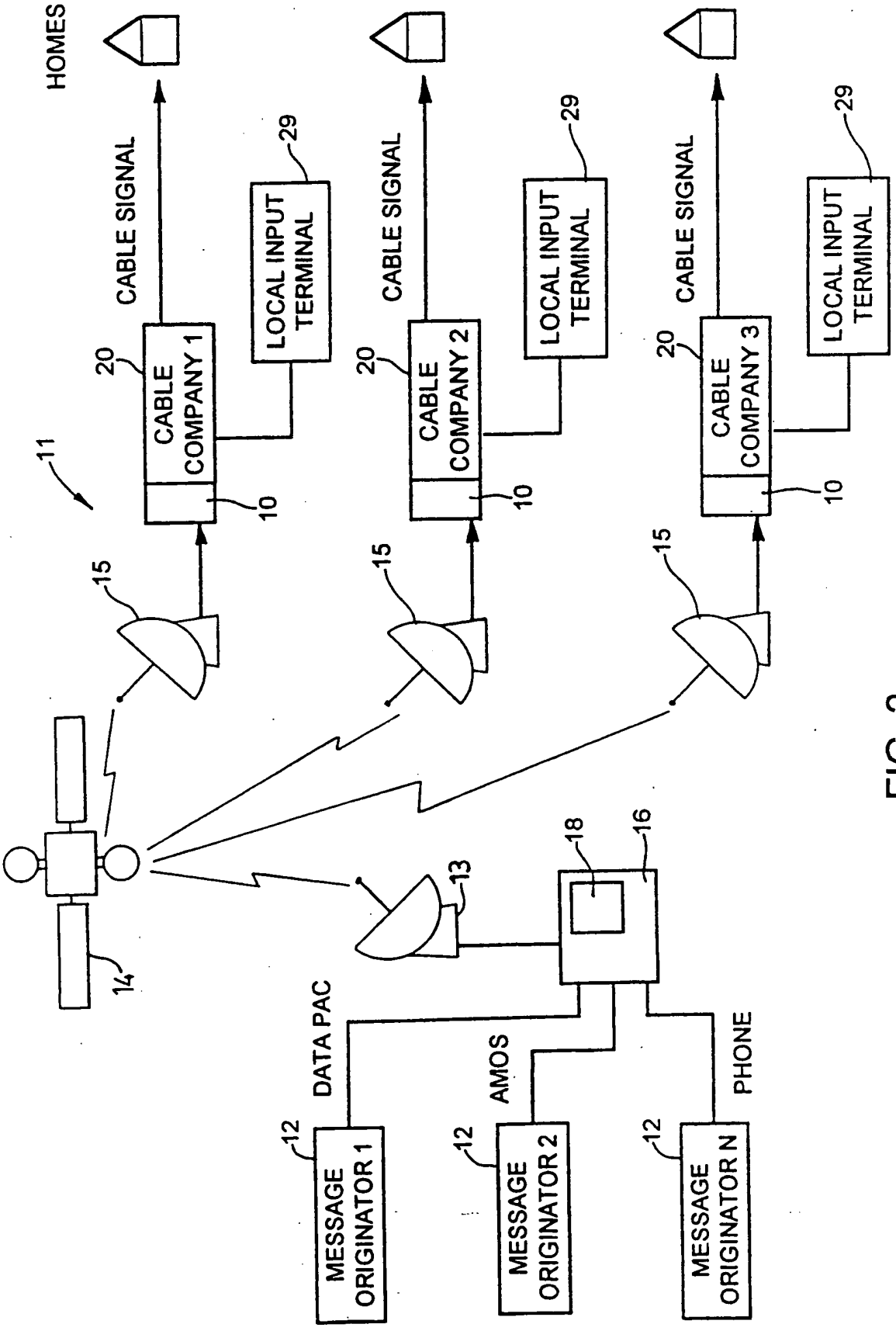

HOMES
CABLE SIGNAL
CABLE COMPANY 1
CABLE COMPANY 2
CABLE COMPANY 3
LOCAL INPUT TERMINAL
LOCAL INPUT TERMINAL
LOCAL INPUT TERMINAL
20
20
20
29
29
29
10
10
10
11
15
15
15
13
14
16
18
DATA PAC
AMOS
PHONE
12
12
12
MESSAGE ORIGINATOR 1
MESSAGE ORIGINATOR 2
MESSAGE ORIGINATOR N

FIG. 2

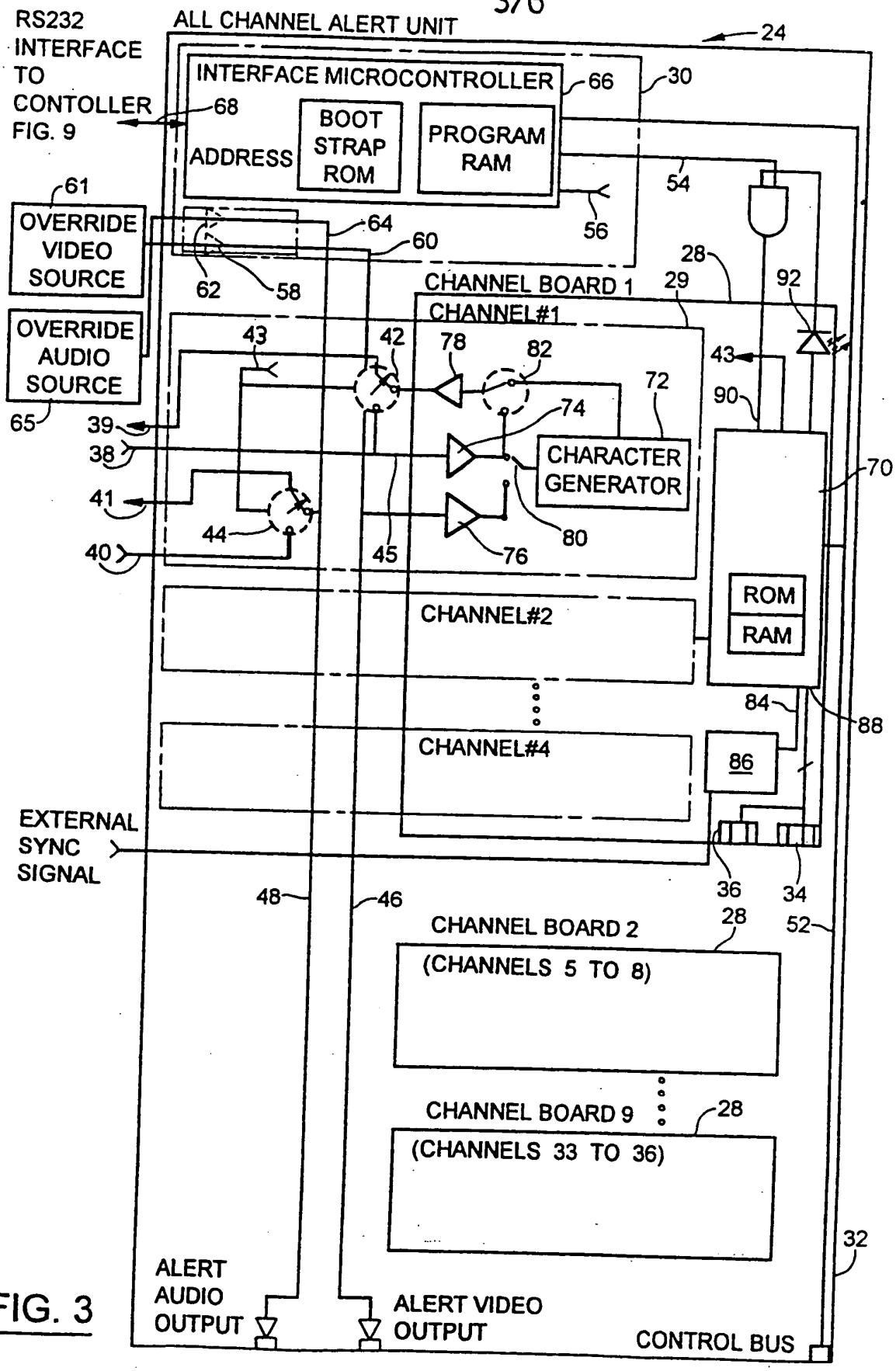

RS232 INTERFACE TO CONTOLLER FIG. 9
ALL CHANNEL ALERT UNIT
24
INTERFACE MICROCONTROLLER
66
30
68
ADDRESS
BOOT STRAP ROM
PROGRAM RAM
54
56
61
OVERRIDE VIDEO SOURCE
64
60
62
58
CHANNEL BOARD 1
29
28
92
CHANNEL#1
OVERRIDE AUDIO SOURCE
43
42
78
82
72
74
65
39
38
CHARACTER GENERATOR
90
70
41
44
45
80
76
40
CHANNEL#2
ROM
RAM
84
88
CHANNEL#4
86
EXTERNAL SYNC SIGNAL
36
34
48
46
CHANNEL BOARD 2
28
52
(CHANNELS 5 TO 8)
CHANNEL BOARD 9
28
(CHANNELS 33 TO 36)
32
ALERT AUDIO OUTPUT
ALERT VIDEO OUTPUT
CONTROL BUS

FIG. 3

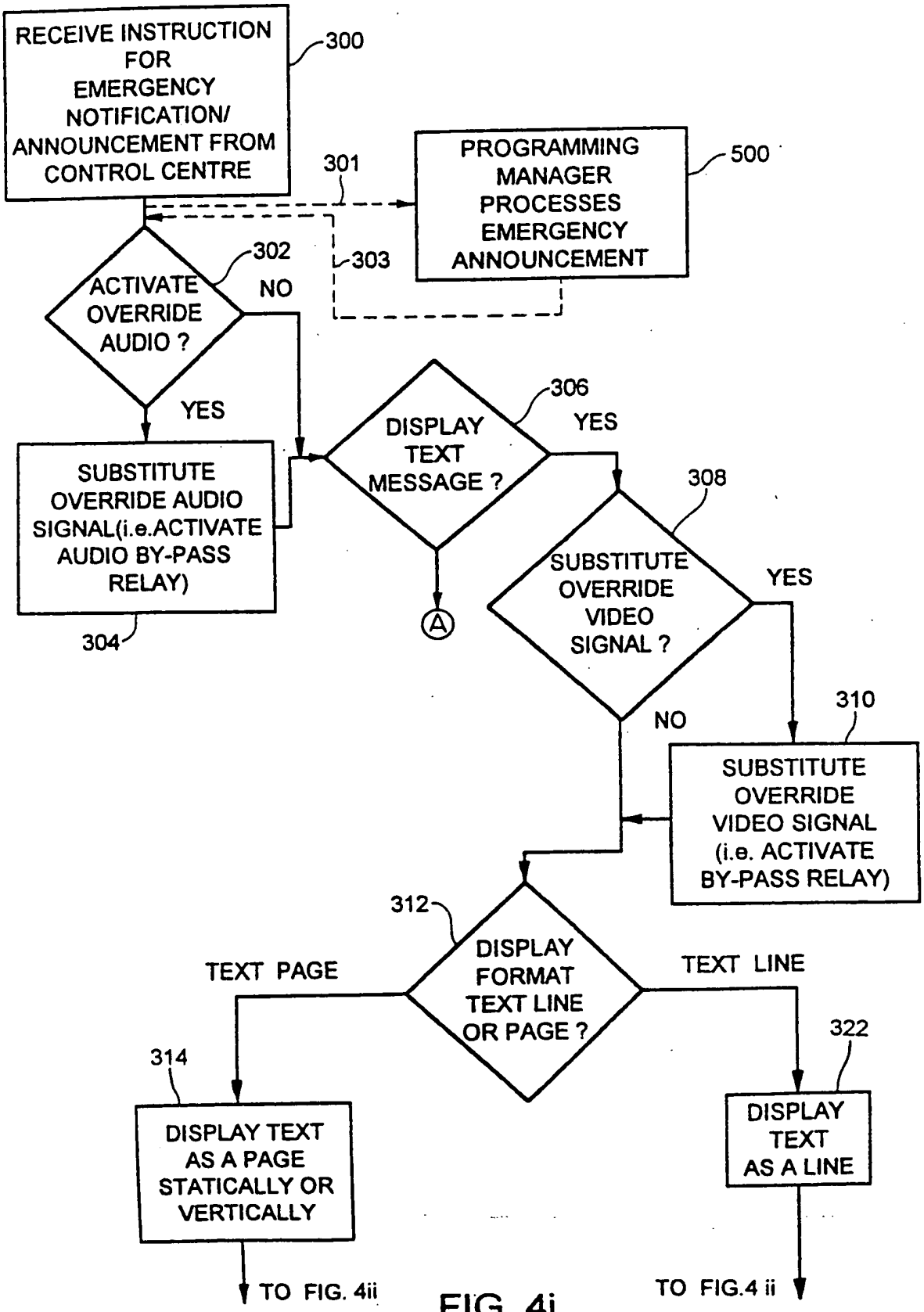

RECEIVE INSTRUCTION FOR EMERGENCY NOTIFICATION/ ANNOUNCEMENT FROM CONTROL CENTRE
300
301
PROGRAMMING MANAGER PROCESSES EMERGENCY ANNOUNCEMENT
500
303
ACTIVATE OVERRIDE AUDIO ?
302
NO
YES
SUBSTITUTE OVERRIDE AUDIO SIGNAL(i.e.ACTIVATE AUDIO BY-PASS RELAY)
304
DISPLAY TEXT MESSAGE ?
306
YES
A
SUBSTITUTE OVERRIDE VIDEO SIGNAL ?
308
YES
NO
SUBSTITUTE OVERRIDE VIDEO SIGNAL (i.e. ACTIVATE BY-PASS RELAY)
310
DISPLAY FORMAT TEXT LINE OR PAGE ?
312
TEXT PAGE
TEXT LINE
DISPLAY TEXT AS A PAGE STATICALLY OR VERTICALLY
314
DISPLAY TEXT AS A LINE
322
TO FIG. 4ii
TO FIG.4 ii

FIG. 4i

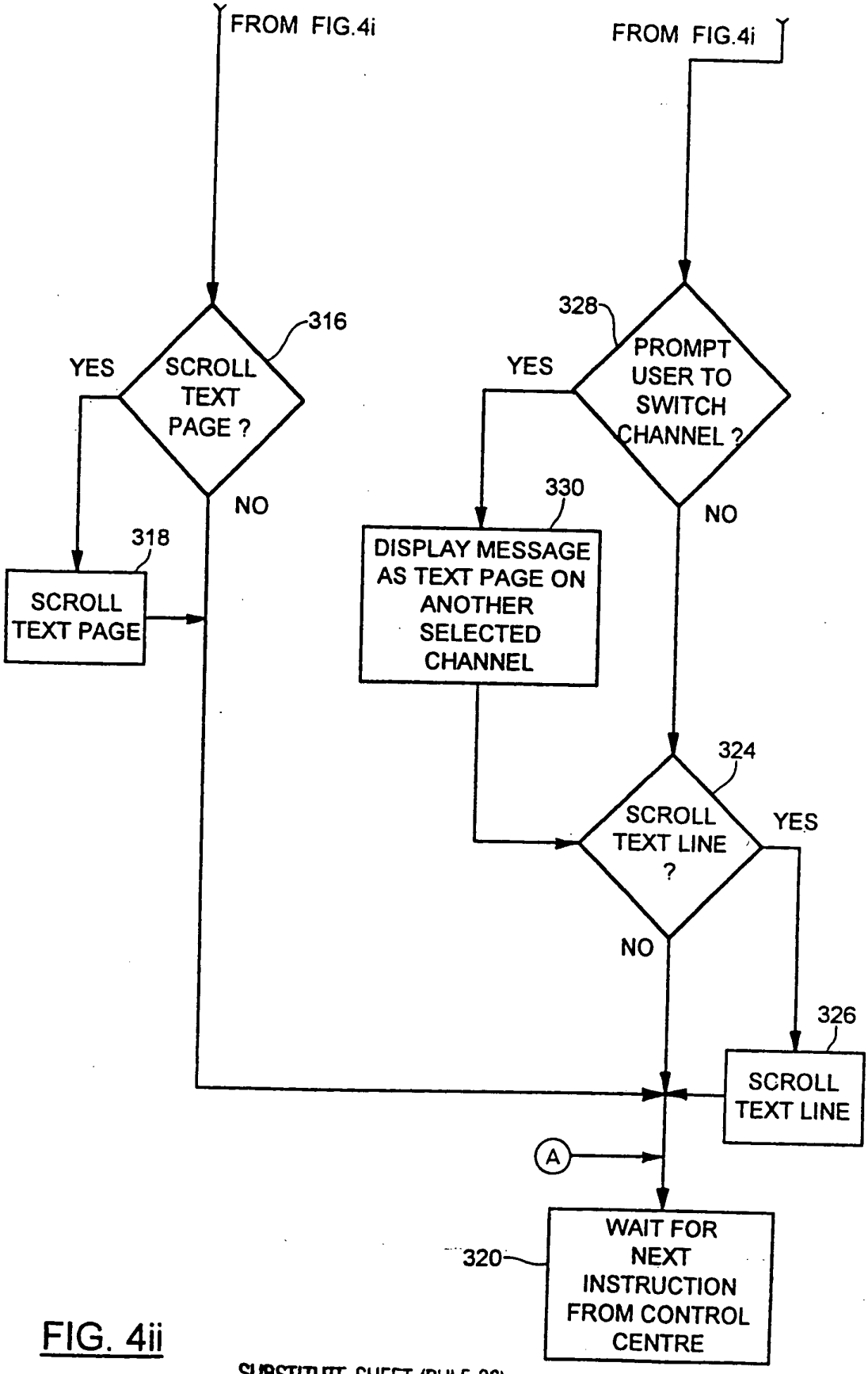

FROM FIG.4i
FROM FIG.4i
316
SCROLL TEXT PAGE ?
YES
NO
318
SCROLL TEXT PAGE
328
PROMPT USER TO SWITCH CHANNEL ?
YES
NO
330
DISPLAY MESSAGE AS TEXT PAGE ON ANOTHER SELECTED CHANNEL
324
SCROLL TEXT LINE ?
YES
NO
326
SCROLL TEXT LINE
A
320
WAIT FOR NEXT INSTRUCTION FROM CONTROL CENTRE

FIG. 4ii

START TIME	PRIORITY AUTHORIZATION CODE	POSTAL CODE(S)	DATA BYTES	CHECKSUM BYTE	END TIME

COMMAND / DATA PACKET FORMAT

FIG. 5

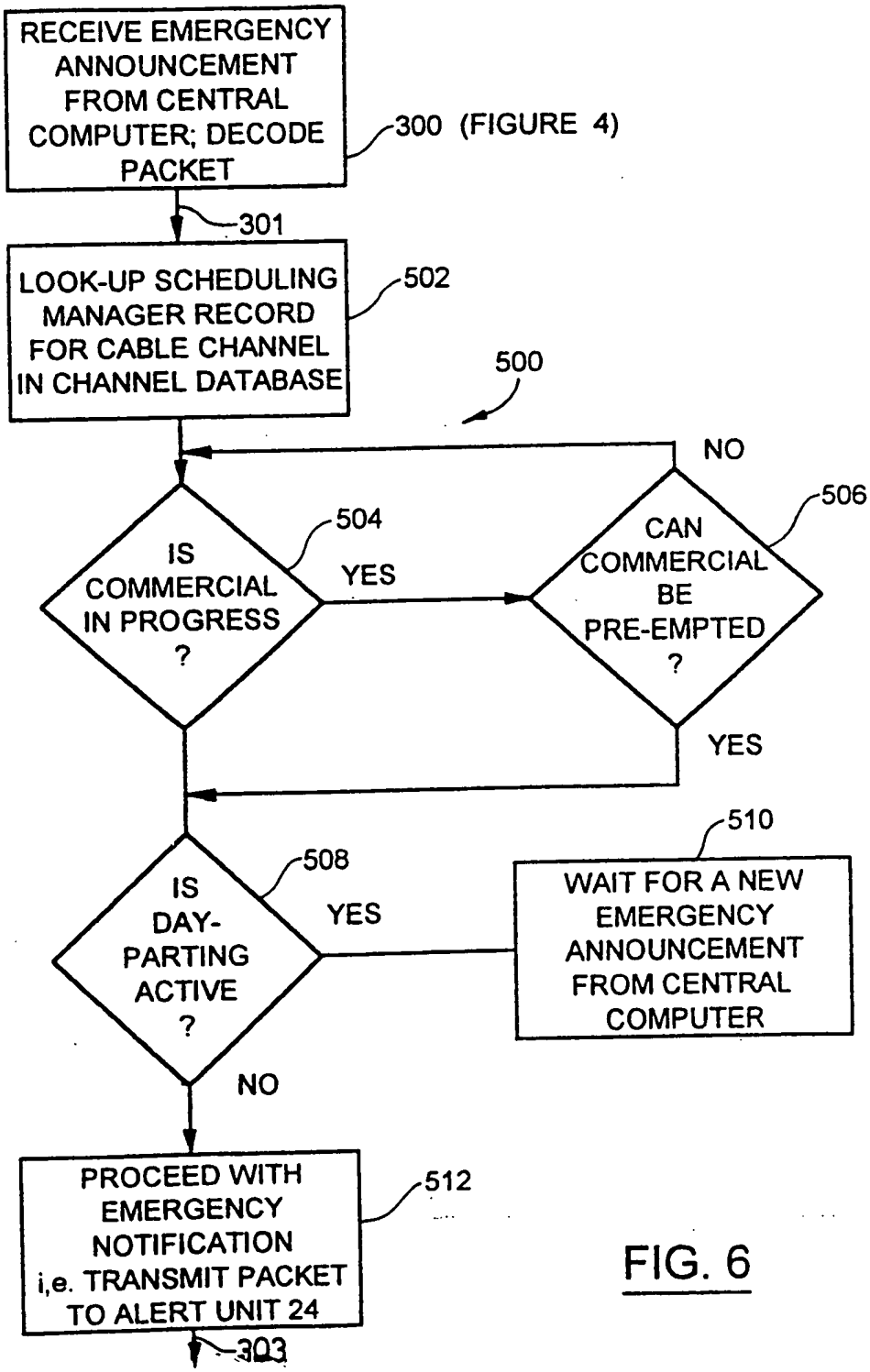


FIG. 6

Inter vnal Application No
PCT/CA 94/00506

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04N7/10 G08B27/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04N G08B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

	Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
1	A	US,A,3 975 583 (T. MEADOWS) 17 August 1976 see column 1, line 1 - column 2, line 39; figure 1 ---	1-19,21
1	A	US,A,5 216 515 (G. STEELE) 1 June 1993 see the whole document ---	1-19,21
1	A	US,A,4 724 491 (T. LAMBERT) 9 February 1988 see the whole document ---	1-19,21
4	A	US,A,4 656 629 (Y. KONDOH) 7 April 1987 see column 1, line 1 - column 2, line 14 -----	1,11,12, 16,17

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

1

Date of the actual completion of the international search	Date of mailing of the international search report
23 December 1994	16. 01. 95

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016	Sgura, S

Form PCT/ISA/210 (second sheet) (July 1992)

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
US-A-3975583	17-08-76	NONE		
US-A-5216515	01-06-93	AU-A-	2008092	30-12-92
		WO-A-	9221206	26-11-92
US-A-4724491	09-02-88	NONE		
US-A-4656629	07-04-87	JP-B-	6054973	20-07-94
		JP-A-	60103788	08-06-85
		AU-B-	576793	08-09-88
		AU-A-	3499284	16-05-85
		CA-A-	1215165	09-12-86
		DE-A-	3485668	27-05-92
		EP-A,B	0141431	15-05-85